
Space Weather Forecast

Issued on Tuesday, 24 January 2023 at 01:29 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales <https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales>

Space Weather Forecast Headline: Reducing risk of R1/R2 Radio Blackouts and G1/Minor Geomagnetic Storms after midweek (UTC).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low in the past 24 hours, with numerous Common-class flares observed. There are currently eleven sunspot regions on the Sun and the northern solar hemisphere hosts most of these with numerous diffuse magnetically bipolar regions. The sunspots in the west being most active. Also there a number filaments (arcs of plasma) on the Sun, with most of these concentrated near the western solar horizon in both hemispheres. Satellite imagery showed a few Coronal Mass Ejections (CMEs) and none appear to have an Earth directed component. After 23/0500UTC, a southeast-directed CME appeared, which is considered to be far-sided and off the Sun-Earth line. No new Earth-directed CMEs were therefore in evidence at the time of writing.

Solar Wind / Geomagnetic Activity: Solar winds showed a relatively noisy trace within Slightly Elevated to Elevated levels observed. These were suggestive of an initial waning fast wind from a 'coronal hole', which then saw a small discontinuity at 23/0300UTC which may suggest influence of one of the expected CMEs, perhaps most likely that from 19 January. The number of particles in the solar wind were at slight above average levels. The magnetic field associated with these particles showed the most noteworthy behaviour in the 24 hours, with a 23/0300UTC discontinuity most marked here, rising from Background to Slightly Elevated levels, while the north-south component varied between similar levels, albeit mainly co-aligned with the Earth's field to limit geomagnetic impacts (thus far). The net effect of the above solar wind measures was Quiet to Unsettled geomagnetic activity.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to remain Low to Moderate, with the most potent regions in the southwest. These should rotate off the disc after midweek UTC to slightly reduce the daily chances of significant class X-ray activity.

Solar Wind / Geomagnetic Activity: The geomagnetic forecast is of lower than average confidence for the period: both due to marginal influence of a number of CMEs before midweek, and also a newly-developed coronal hole fast wind. Initial likely Minor Storm G1 conditions should become less prevalent as the week progresses (barring significant developments), especially as the filaments and more-active southwestern sunspots rotate away from the Sun-Earth line.

Energetic Particles / Solar Radiation: Solar radiation storms have a Slight Chance of reaching S1 or greater through the period given the presence of the larger and more active sunspot regions near the better connecting western solar horizon (should they flare appropriately).

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Geomagnetic Storms:

Geo-Magnetic Storm	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Minor or Moderate	G1 to G2	No	30	20	1	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	No	50	50	40	40
Very Active	R3 to R5 X	No	5	5	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm ⁻² sr ⁻¹ s ⁻¹)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	15	15	15	15
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = cm⁻²sr⁻¹s⁻¹)